Cornell University Announcements Graduate School of Nutrition 1973–74

Cornell University

Graduate School of Nutrition

1973–74

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Cornell University Announcements

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Cornell Academic Calendar

1972–73

Registration, new students	Thursday, August 31
Registration, continuing and rejoining students	Friday, September 1
Fall term instruction begins, 7:30 a.m.	Monday, September 4
Thanksgiving recess:	
Instruction suspended, 1:10 p.m.	Wednesday, November 22
Instruction resumed, 7:30 a.m.	Monday, November 27
Fall term instruction ends, 1:10 p.m.	Saturday, December 9
Independent study period begins, 2:00 p.m.	Saturday, December 9
Final examinations begin	Thursday, December 14
Final examinations end	Friday, December 22
Registration, new and rejoining students	Thursday, January 18
Registration, continuing students	Friday, January 19
Spring term instruction begins, 7:30 a.m.	Monday, January 22
Spring recess:	
Instruction suspended, 1:10 p.m.	Saturday, March 17
Instruction resumed, 7:30 a.m.	Monday, March 26
Spring term instruction ends, 1:10 p.m.	Saturday, May 5
Independent study period begins, 2:00 p.m.	Saturday, May 5
Final examinations begin	Monday, May 14
Final examinations end	Tuesday, May 22
Commencement Day	Friday, May 25

The dates shown in the Academic Calendar are subject to change at any time by official action of Cornell University.

In enacting this calendar, the University Senate has scheduled classes on religious holidays. It is the intent of Senate legislation that students missing classes due to the observance of religious holidays be given ample opportunity to make up work.

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The courses and curricula described in this *Announcement,* and the teaching personnel listed herein, are subject to change at any time by official action of Cornell University.

Cornell University

Graduate School of Nutrition

The Graduate School of Nutrition was founded in 1941 to provide graduate training and research opportunities in nutrition at Cornell. Although graduate programs in nutrition are now available in other departments of the University, the Graduate School of Nutrition offers its own broad academic program designed not only as a final preparation for those students who, after graduation, wish to work in the area of nutritional science, but also as an excellent background for students who are deciding upon a specific area for doctoral training in nutrition or a related science. Special instruction is available to students whose previous academic training has not been in the area of nutrition.

In the past, the study of nutrition dealt with the relationships between the biological sciences and the intact organism in the healthy or diseased state. Today the concept of nutrition embraces many more disciplines including the behavioral sciences, food technology, economics, and education. Appreciating the fact that the science of nutrition cannot exist separately from fundamental biochemistry, the research and training programs of the Graduate School of Nutrition have for some time been aligned with heavy emphasis on biochemistry in areas ranging from the study of enzymological phenomena at the subcellular level to the direct application of biochemical principles in animals and man.

In keeping with the growing recognition of the interdependence of the nutritional and social sciences, the research programs at the School also include such studies as the effect of early nutrition on behavioral development and investigations of the complex social, cultural, and economic factors which influence nutritional practices and contribute to the vast problem of malnutrition during early life.

Nutrition Programs at Cornell

In addition to the Graduate School of Nutrition which offers the professional degree program described in this *Announcement* leading to the degree of Master of Nutritional Science (M.N.S.), there are two other units of the University which offer graduate programs in nutrition.

First, the Graduate Field of Nutrition includes all Cornell faculty members who are qualified to direct graduate students toward the M.S. or Ph.D. degree in the many biological subdivisions of nutrition. Second, the Graduate Field of Human Nutrition and Food is staffed mainly by faculty from the New York State College of Human Ecology and offers another program which also leads to the M.S. or Ph.D. degree. The professional degree program differs from the M.S. degree programs primarily in that it has a planned curriculum, and therefore more attention is given to breadth of background in a variety of academic subjects than is usually the case in the curriculum leading to the M.S. degree. However, many students who have obtained the excellent training of the M.N.S. degree continue for a Ph.D. degree. In addition to a core faculty of the Graduate School of Nutrition, the faculty of a number of departments and divisions of the University are drawn upon to provide counseling and instruction in the School's program.

For more information about the three

different nutrition programs, write to the Editor of Publications, Savage Hall, for the brochure entitled *Graduate Study in Nutrition at Cornell.*

The Faculty

A faculty of more than forty professors serves the Graduate School of Nutrition to make possible the School's extensive program. Most of the faculty members hold joint appointments in the Graduate School of Nutrition but have their primary affiliation in other colleges at Cornell. The core faculty includes twelve professors whose primary appointments are in the School. Among the core faculty members are biochemists working in areas from subcellular enzymology to the more direct application of biochemistry to the nutritional status of the intact organism; physicians conducting continuous metabolic studies of a variety of clinical conditions; experimental nutritionists and an experimental psychologist using animals to replicate some of the more serious problems of malnutrition in man; and public health nutritionists and physicians training students for careers in public health and community nutrition, either domestic or international, and conducting research in the applied problems of nutrition.

The complete faculty of the School also includes animal nutritionists, food economists, food scientists, and specialists in other areas related to agriculture and home economics.

Core faculty offices and laboratories are located in Savage Hall.

Curriculum

The Graduate School of Nutrition offers a professional degree, Master of Nutritional Science (M.N.S.). Considering the many disciplines associated with nutrition, this master's degree program is designed to be academically strong and professionally useful. The caliber of positions held by graduates reflects the quality of training received. The student obtains a firm foundation in the sciences basic to his chosen area of specialization and practical preparation for work in his professional career through carefully selected courses and a special research problem. Each student selects a faculty adviser in whose area of specialization his own interests lie from among those on the entire faculty or, more frequently, from among members of the core faculty. The adviser plans the curriculum to meet the student's particular needs according to his educational background, area of graduate study, and professional goals after graduation and directs the student's research problem including a report of thesis quality.

Having completed the M.N.S. degree students will find that they have had excellent training for more advanced study in areas such as biochemistry, physiology, and nutrition (animal or human) or, when their ambitions are not yet established, that the program has been particularly helpful in the selection of an area of graduate study leading to a Ph.D. degree.

Master of Nutritional Science

One of the strengths of the School, not found in many other institutions, is that there are a number of specializations within the M.N.S. degree program. Among these are: nutritional biochemistry, experimental animal nutrition, clinical nutrition, public health nutrition and international nutrition.

The basic training for the degree emphasizes the physical and biological sciences and the basic principles of nutrition. Through an appropriate curriculum planned by his adviser, the student learns to apply these basic principles in the particular specialization in which he wishes to become proficient. Experience in a laboratory or in field work usually becomes the basis of the special research problem report. Facilities for research include biochemical, microbiological, and physiological laboratories, experimental animal quarters, a diet table for experimental work in human studies, and a metabolic unit in Savage Hall for the study of nutrition in relation to disease.

Since two of the specializations—public health nutrition and international nutrition—involve special arrangements for field experience rather than laboratory training, they will be described in more detail.

Public Health Nutrition. Special opportunities are provided for students of appropriate background who want to work as community nutritionists with health and welfare agencies. The curriculum in this specialization includes certain phases of the social sciences, education, clinical and public health nutrition, and appropriate information service techniques. Students accepted

for training in this area gain further insight into public health nutrition by spending a two-month summer period in "in-service" nutritional training as applied to the community and to public health under the supervision of a qualified public health nutritionist. Assistance will be given in making the necessary contacts to obtain a training program directed by a qualified nutritionist. Students must be prepared to defray living costs. These field assignments may form the basis for a portion of the required report on an individual's research problem.

International Nutrition. The Program on International Nutrition will lead to the Master of Nutritional Science in international nutrition. The School offers the program to meet the need for professionally trained men and women to work for government and international agencies in countries where malnutrition and undernutrition exist. Persons not wishing to enter one of the degree programs may receive training in international nutrition by enrolling as a special student or, if qualified, as a postdoctoral fellow. This training is suitable for those who have a good background in nutrition and who are preparing to enter service in a nutrition program with an international agency. The program includes courses in the sciences basic to nutrition that are extensive enough to equip students for a variety of careers in nutrition.

Emphasis in electives is then placed on specialized study in problems and programs in international nutrition and related areas such as agriculture, public health, extension teaching, sociology, anthropology, demography, economics, and nutrition education. It is usually possible for students to obtain supervised field experience in a nutrition program in a developing country for two or three months. Several traineeships and assistantships are available to qualified students. For further details, request the leaflet *Program in International Nutrition* from the Graduate School of Nutrition.

The Ph.D. Degree at Cornell

At Cornell, all graduate programs for the Ph.D. degree are under the jurisdiction of the Graduate School of the University and are directed by Fields. Faculty members of the Graduate School of Nutrition are members of certain Fields of the Graduate School such as Biochemistry, Nutrition, Human Nutrition and Food, Physiology, Agricultural Economics and Experimental Psychology. The academic background of a professor determines the Field in which he is appointed.

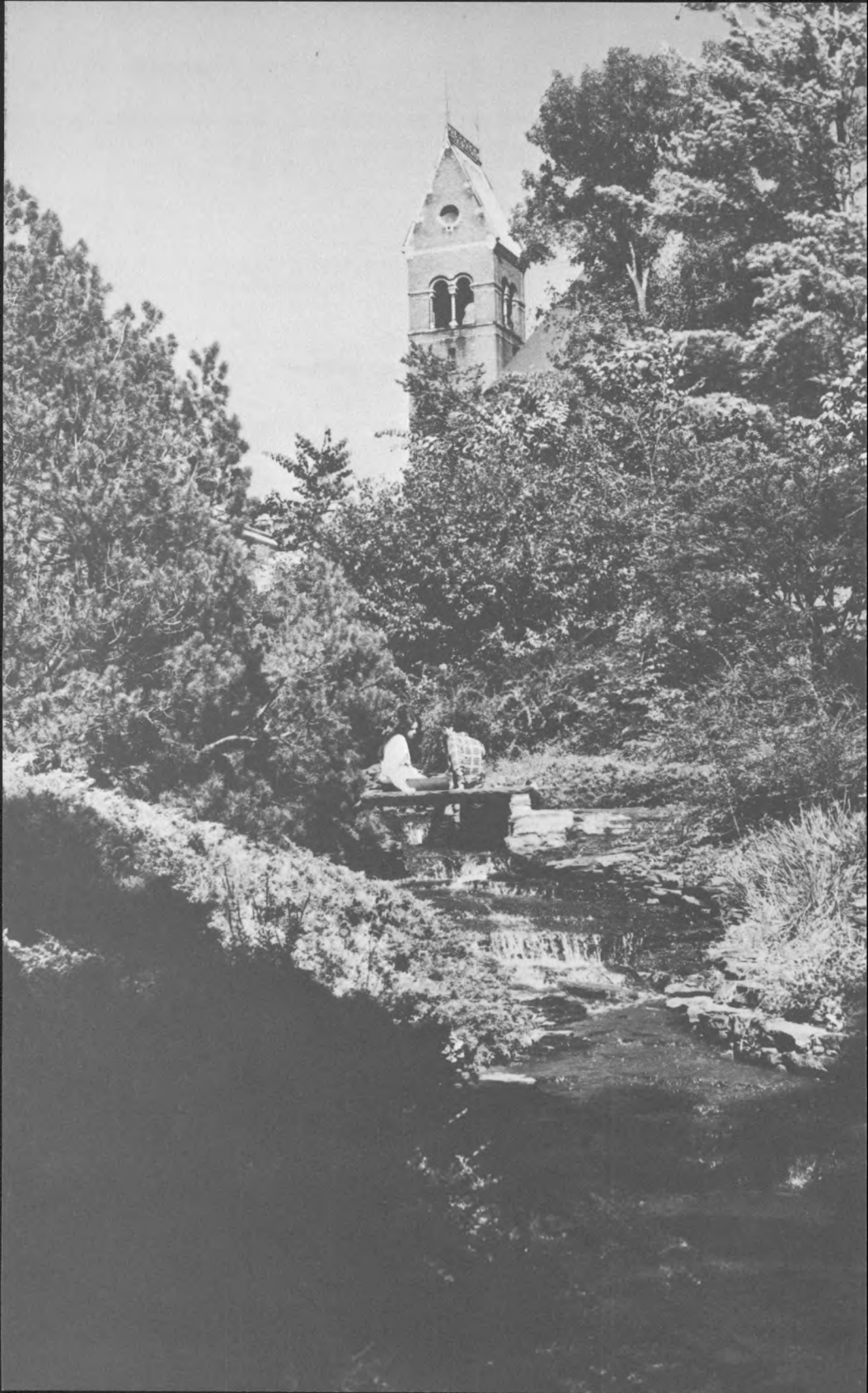
Graduate training and research are major responsibilities of the core faculty of the Graduate School of Nutrition. It is through this faculty and the research they conduct that training for the Ph.D. degree is carried out in the School. More than half the students completing the M.N.S. degree at the School continue toward a Ph.D. degree with the advantage of doing so without disturbing the continuity of their studies. Often a Ph.D. candidate continues to work with his original adviser because the student has a research interest developed through close association with his professor during the master's degree program.

Postdoctoral Studies

As in all scholarly pursuits, training in research does not end with a doctoral degree. It is becoming more and more common for students receiving the Ph.D. degree to continue their training in research for one or two postdoctoral years. Mature scientists also frequently seek an opportunity to revitalize their research programs using sabbatical or other types of leaves from their home institutions to come here for additional research experience. Thus there are always some of these scientists working at the postdoctoral level at the Graduate School of Nutrition; not only do they gain from the experience but their presence here is stimulating to the staff and students of the School.

Special Students

When staff and facilities are available, some applicants who do not intend to work toward an advanced degree at Cornell may be admitted. Normally such students wish to achieve particular objectives by taking courses and special training in graduate nutrition programs. In order to be admitted to a nondegree program, a student should have a Bachelor's degree although, with appropriate justification, this requirement may be waived. These special students are not subject to the standard course requirements for admission to the Graduate School of Nutrition, nor to requirements for course work to be completed for graduate degrees.



Registration in such a program is restricted to two semesters.

Summer Session Study

A student registered in the Graduate School of Nutrition may receive credit for courses completed at the University during the summer if his program is approved in advance by his faculty adviser. To receive this credit he must also be registered in the University Summer Session.

The student may earn residence credit by registering for a minimum of four or a maximum of twelve weeks for summer research on his individual problem under the personal direction of a member of the faculty of the School. The student thus uses the summer period to meet, in whole or in part, the requirements of six semester hours for the Special Problem, Graduate School of Nutrition 710. See p. 13.

To receive credit for summer courses and/or research, students must complete official registration using forms provided by the Office of the Registrar and administered by the Office of the Summer Session.

Admission Requirements

It is the policy of Cornell University actively to support the American ideal of equality of opportunity for all. No student shall be denied admission or be otherwise discriminated against because of race, color, creed, religion, or national origin.

To be admitted to a Master of Nutritional Science degree program in the Graduate School of Nutrition, an applicant must hold a baccalaureate degree from a college or university of recognized standing or have completed work equivalent to that required for such a degree at Cornell. He must show promise of ability to pursue advanced study and research satisfactorily as judged by his previous record. To enter graduate study the applicant must also have adequate preparation and a definite interest in his chosen field of specialization although his previous academic training need not necessarily be in the area of nutrition.

All applicants for admission and fellowship consideration are required to take the Graduate Record Examinations (GRE) Aptitude Tests (verbal and quantitative) of the Educational Testing Service and to have the scores sent to the Cornell Graduate School as part of their application materials. Information about the times and places of test administrations may be obtained directly from the Educational Testing Service, Princeton, New Jersey 08540.

English Proficiency Requirement

Foreign applicants whose native language is not English and who have not received their secondary-school or university education in the English language must take the Test of English as a Foreign Language by arrangement with Educational Testing Service, Princeton, New Jersey 08540, U.S.A. or the Michigan English Language Test by arrangement with the English Language Institute, University of Michigan, Ann Arbor, Michigan 48104, U.S.A. The test scores must be reported directly by the testing organization to the Graduate School as part of the essential application information. No final action on applications will be taken until the scores have been received. Students must receive a minimum score of 550. Both testing programs are available throughout the world. Information on times and places for administration of the tests may be obtained directly from the addresses given above. Since these tests are diagnostic, admission to those applicants whose scores indicate unsatisfactory command of English may be denied or may be made contingent upon evidence of improved command of English.

If English has been the medium of instruction in the secondary school or university, a statement to this effect signed by a responsible officer of a United States embassy or consulate or by an appropriate official of the educational institution involved should be sent to the Graduate School.

Academic Requirements

To qualify for admission an applicant must have completed, with an above average record, courses in the following groups of subjects with the approximate number of semester hours as stated. A weekly one-hour lecture per fifteen-week term is approximately equal to one semester hour credit. An applicant who cannot meet in full the specific course requirements may be admitted, if the faculty of the School so recommends, with the understanding that the deficiencies must be made up before graduation without credit toward the de-

gree. Academic requirements for admission depend on whether the student wants to concentrate on the biological aspects of nutrition—nutritional biochemistry, experimental animal nutrition, or clinical nutrition—or on the social science aspects of nutrition—international nutrition or public health nutrition.

For Concentration on Biological Aspects of Nutrition

Courses in quantitative or organic chemistry or elementary courses in physics or physiology, taken following admission to complete entrance requirements, cannot be counted toward graduation.

Physical Sciences. A total of twenty semester hours are required divided among chemistry, physics, and mathematics. Courses in quantitative chemistry and organic chemistry are prerequisites to courses required for graduation. If students demonstrate suitable training and experience in quantitative methods, a course in quantitative chemistry is not necessary. If they are not offered for entrance, they must be taken following admission. Students who enter without college training in physics are required to take an elementary course in that subject before graduation.

Biological Sciences. A total of twelve hours are required in such courses as biology, botany, zoology, microbiology, and physiology. Up to three credit hours in animal or human nutrition may be counted.

Social Studies. A total of nine hours in such subjects as economics, government, education, psychology, anthropology, and history is required for entrance.

Other Courses. The applicant's record must show evidence that he has satisfactorily completed other courses prerequisite to those required by the candidate for a degree.

Recommended Courses. Students who have completed the above entrance requirements prior to receiving a baccalaureate degree are urged to take as many as possible of the following subjects in order to be better prepared for some of the more advanced courses required for graduation: physical chemistry, calculus, courses related to physiology—zoology, comparative anatomy, embryology—and/or two terms of organic chemistry.

For Concentration on Social Science Aspects of Nutrition

Courses in quantitative or organic chemistry or elementary courses in physics or physiology taken following admission to complete entrance requirements cannot be counted toward graduation.

Physical Sciences. A total of sixteen semester hours divided among chemistry, physics, and mathematics are required. Courses in organic chemistry and quantitative chemistry are required for graduation. If they are not offered for entrance, they must be taken following admission. If the student can demonstrate suitable training and experience in quantitative methods, a course in quantitative chemistry is unnecessary. Students who enter without college training in physics are required to take an elementary course in that subject before graduation.

Biological Sciences. A total of nine hours in such courses as biology, botany, zoology, microbiology, and physiology are required. Up to three credit hours in animal or human nutrition may be counted.

Social Studies. A total of twelve hours in such subjects as economics, government, education, psychology, anthropology, and history is required for entrance.

Humanities. A total of four hours in such subjects as English, other languages, classics, and arts are required.

Other Courses. The applicant's record must show evidence that he has satisfactorily completed other courses prerequisite to those required by a candidate for a degree.

Recommended Courses. See this page.

University Health Requirements

The following health requirements for entering graduate students have been adopted by the Cornell Board of Trustees. Failure to fulfill these requirements will result in loss of the privilege of registering the following semester. The responsibility for fulfilling these requirements rests with the student.

(1) A satisfactory certificate of immunization against smallpox, on the form supplied by the University, must be submitted before registration. It will be accepted as satisfactory only if it certifies that within the last three years a successful vaccination has

been performed. If this requirement cannot be fulfilled by the student's home physician, opportunity for immunization will be offered by the Cornell medical staff during the student's first semester, with the cost to be borne by the student. If a student has been absent from the University for more than three years, immunity will be considered to have lapsed, and a certificate of revaccination must be submitted.

It is strongly recommended by the University Health Services that all graduate students have immunization against tetanus before entering the University. All graduate students may, however, obtain initial and all booster tetanus toxoid immunizations at the Gannett Medical Clinic for a nominal charge.

(2) Graduate students, when accepted, must submit health histories on forms supplied by the University. These should be returned promptly to the Gannett Medical Clinic. A University physician will review the material before it becomes part of the student's permanent health record. All information given is confidential. After arrival at Cornell, if the medical history indicates a need, a student will be given an appointment to consult a physician at the Clinic. When a student has been away from the University for more than a year, he must, upon reentrance, submit an interim health history on a University form.

(3) Every student is required to have a chest X ray. Opportunity is given to satisfy this requirement during the student's first week on campus. The cost of the x-ray examination is included in tuition. When a student who has been away from the University for more than a year wishes to reenter he must, at his own expense, again fulfill the chest x-ray requirement.

Applications and Registration

Applicants for admission should address their inquiries to the Office of the Graduate School, Sage Graduate Center, Cornell University, Ithaca, New York 14850. The form the applicant will receive is one which is used in all areas of graduate study and does not apply in all of its details to Graduate School of Nutrition applicants. In completing the form, applicants must indicate an interest in *nutritional science for the M.N.S. degree in the Graduate School of Nutrition.* It is not necessary to indicate a minor area of study. No application will be acted upon until all credentials enumerated in the application form have been filed.

All students admitted to the Graduate School of Nutrition must register through the Graduate School office, Sage Graduate Center, at the beginning of each term or session.

Arrangement for withdrawal from courses must be arranged at the Graduate School Office in Sage Hall.

Graduation Requirements

Academic Requirements

The degree of Master of Nutritional Science (M.N.S.) is awarded after satisfactory completion of a special research problem and courses considered basic to an understanding of nutritional science.

For graduation a student must have completed the necessary residence requirements (p. 15) and have obtained a cumulative grade average of at least a B– in a minimum of thirty-two semester hours of specified and approved courses. A weekly one-hour lecture each fifteen-week term is approximately equal to one semester hour credit. An additional six semester hours must be completed in a special research problem. The student must prepare a written report on this approved special research problem and must pass a final oral examination on the report and related course work. The following is a summary of academic requirements for graduation:

Courses	*Hours*
Biochemistry	4
Principles of nutrition	3
Laboratory work in nutrition	3
Advanced physiology	3
Food economics	3
Statistics	3
Seminar	1
Advanced courses in nutrition	3
International or public health nutrition	3
Additional courses*	6
Special problem	6
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* Students concentrating on the biological aspects of nutrition will be required to do a laboratory course in biochemistry (three semester hours) and additional advanced physiology (three semester hours). Students concentrating on the social science aspects of nutrition will take approved graduate courses in the social sciences.

To round out the professional training in nutritional science, the student's adviser and the faculty of the Graduate School of Nutrition may require him to take certain courses deemed appropriate to his area of interest. In the event that certain required courses have been satisfactorily completed by the student prior to his entrance to the School, substitutions will be made with the approval of his adviser.

Faculty advising students for the M.N.S. degree include B. J. Apgar, R. E. Austic, R. H. Barnes, A. Bensadoun, J. Bowering, D. L. Call, C. L. Comar, L. J. Daniel, M. M. Devine, J. L. Gaylor, L. R. Hackler, H. F. Hintz, D. E. Hogue, L. Krook, M. C. Latham, F. W. Lengemann, D. A. Levitsky, J. K. Loosli, D. B. McCormick, M. A. Morrison, W. L. Nelson, M. C. Nesheim, K. J. Newman, W. G. Pond, J. T. Reid, J. M. Rivers, D. A. Roe, D. Sanjur, R. Schwartz, M. L. Scott, V. Simko, S. E. Smith, K. L. Turk, D. Van Campen, R. J. Van Soest, W. J. Visek, R. G. Warner, R. H. Wasserman, H. H. Williams, L. D. Wright, C. M. Young, R. J. Young, D. B. Zilversmit.

The minimum curriculum to be completed, including the number of semester hours required and courses generally taken to fulfill the requirement, depends on whether the student wishes to concentrate on the biological aspects of nutrition—nutritional biochemistry, experimental animal nutrition, or clinical nutrition—or on the social science aspects of nutrition—international nutrition or public health nutrition.

Concentration on the Biological Aspects of Nutrition

Below is the minimum curriculum to be completed. Each category includes semester hours required and courses generally taken to fill the requirement. These are minimum requirements and are normally supplemented with additional courses.

Biochemistry. Seven semester hours. Students generally take Biological Sciences 431 and 430 or 531 and 532. Other courses approved to fill this requirement are listed in the Biochemistry section of the Description of Courses (p. 19).

Principles of Nutrition. Three semester hours. One of the following courses is generally taken: Human Nutrition and Food 431 (p. 26), Animal Science 410 (p. 28), or Graduate School of Nutrition 620 (p. 24).

Laboratory Work in Nutrition. Three semester hours. Students generally take Animal Science 511 (p. 28) or Human Nutrition and Food 524 (p. 26).

Advanced Physiology. Six semester hours. Students generally take Biological Sciences 414 (p. 29).

Food Economics. Three semester hours. Students generally take Graduate School of Nutrition 590 (p. 30).

International Nutrition or Public Health Nutrition. Three semester hours. Students generally take Graduate School of Nutrition 580 or 650 (p. 25).

Advanced Courses in Nutrition. Three semester hours. Courses approved for this credit are listed below

Courses	*Hours*
Human Nutrition and Food 501, Proteins and Amino Acids	2
Poultry Science 502, Lipids and Carbohydrates	2
Animal Science 503, Nutritional Energetics	2
Poultry Science 504, Proteins and Minerals	2
Veterinary Pathology 931, Pathology of Nutritional Diseases	3
Graduate School of Nutrition* 580, International Nutrition Problems, Policy, and Programs	3
Graduate School of Nutrition* 650, Clinical and Public Health Nutrition	3
Human Nutrition and Food† 431, Human Nutrition	3
Human Nutrition and Food 441, Nutrition and Disease	3
Human Nutrition and Food 512, Nutrition and Growth	2
Human Nutrition and Food 514, Readings in Nutrition	3
Biological Sciences 530, Biochemistry of the Vitamins	2
Biological Sciences 633–638, Advanced Biochemistry Series	1 to 6

* Approved for credit if not taken previously to fulfill International Nutrition or Public Health Nutrition requirement.

† Approved for credit if not taken previously to fulfill Principles of Nutrition requirement.

Seminar. One semester hour. Students generally take Graduate School of Nutrition 700 (p. 25).

Special Problem. Six semester hours. Graduate School of Nutrition 710 (see p. 13 for details).

Statistics. Three semester hours. One of the following courses is usually taken: Statistics and Biometry 510 or 511, or Industrial and Labor Relations 510 (p. 23).

Concentration on the Social Science Aspects of Nutrition

Biochemistry. Four semester hours. Students generally take Biological Science 431. Other courses approved to fill this requirement are listed in the Biochemistry section of the Description of Courses (p. 19).

Principles of Nutrition. Three semester hours. One of the following courses is generally taken: Human Nutrition and Food 431 (p. 26), Animal Science 410 (p. 28), or Graduate School of Nutrition 620 (p. 24).

Laboratory Work in Nutrition. Three semester hours. Students generally take Animal Science 511 (p. 28) or Human Nutrition and Food 524 (p. 26).

Advanced Physiology. Three semester hours. Students generally take Graduate School of Nutrition 570 (p. 28).

Food Economics. Three semester hours. Students generally take Graduate School of Nutrition 590 (p. 30).

Statistics. Three semester hours. One of the following courses is usually taken: Statistics and Biometry 510 or 511, or Industrial and Labor Relations 510 (p. 23).

Seminar. One semester hour. Students generally take Graduate School of Nutrition 700 (p. 25).

Special Problem. Six semester hours. Graduate School of Nutrition 710. (See below for details.)

Advanced Courses in Nutrition. Three semester hours. Courses approved for this credit are the same as those approved for students concentrating on the biological aspects of nutrition (see p. 12).

International Nutrition or Public Health Nutrition. Three semester hours. Students generally take Graduate School of Nutrition 580 or 650 (p. 25).

Social Sciences. Six semester hours. Only graduate courses are approved to fill this requirement. Three semester hours are normally in demography (Sociology 530, 531, or 535), and three semester hours in some other area of social studies. Students should check the *Announcement of the College of Arts and Sciences* for graduate level course listings in Anthropology, Psychology, Sociology, Rural Sociology and Economics.

Special Research Problem—Report and Examination

The research involved in the special problem report, which should be of thesis quality, may be directed by any joint faculty member of the student's choice who is willing to supervise it. However, members of the core faculty serve as advisers most frequently. The research problem is normally assigned by the student's faculty adviser.

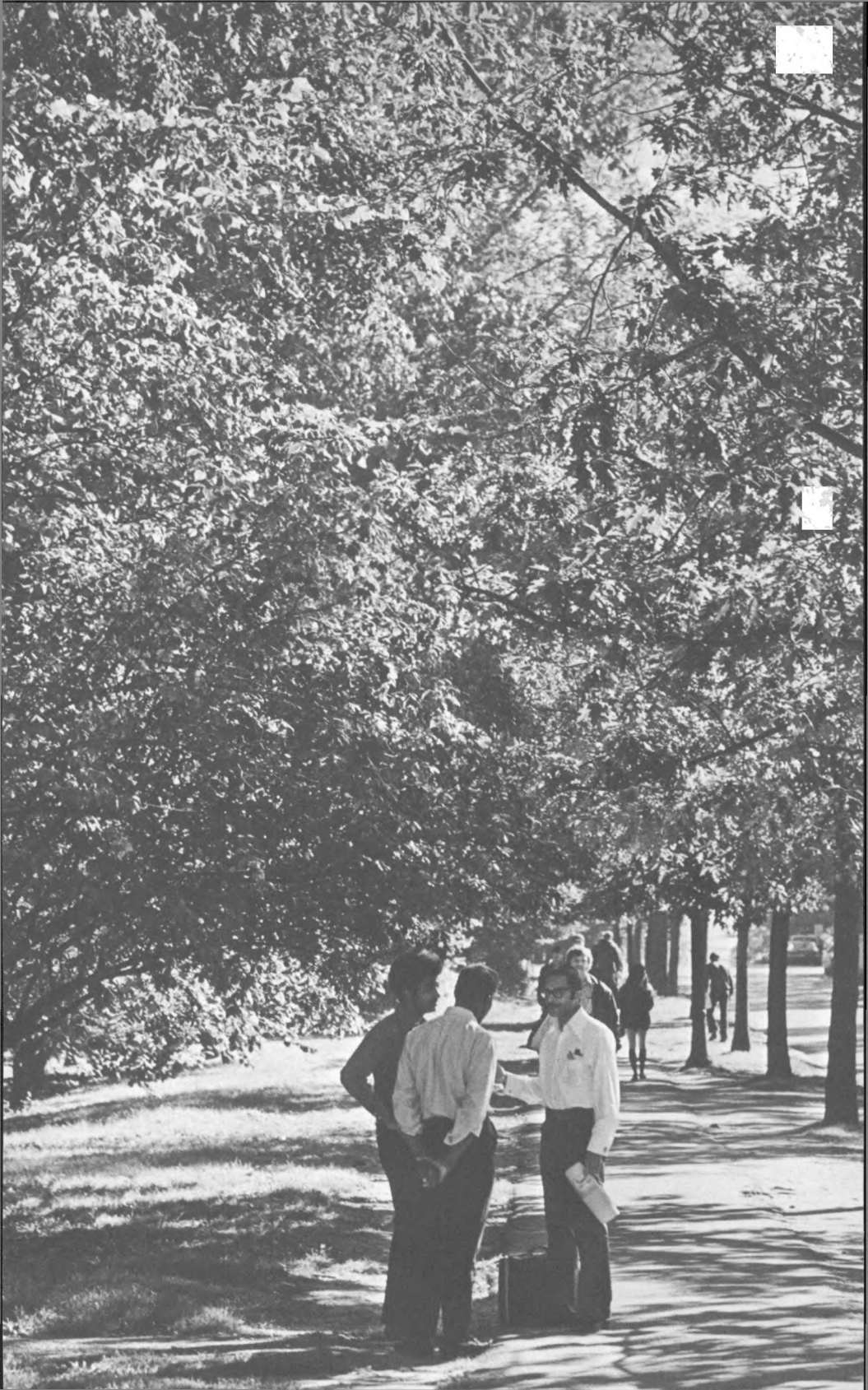
A written report of the special research problem and a final oral examination covering both research report and course work are required. The examination is arranged at a time suitable to the examining committee which is comprised of the student's adviser plus at least one other member of the faculty to be designated by the faculty of the Graduate School of Nutrition or its delegated agent. A legible copy of the report as approved by the student's adviser must be submitted to the examining committee at least one week prior to the final examination.

The final copy of the written report, including any changes recommended by the examining committee, must be submitted to the Office of the Dean of the Graduate School of Nutrition as soon as possible after the final examination. This report should be typed, double spaced, on 8½-by-11-inch paper. Either the original ribbon copy on Cornell bond paper, or a good quality Xerox copy, should be bound in black cloth and lettered both on the front and spine of the volume. An appropriate copy must be presented to the student's faculty adviser. Further directions concerning the form in which the report is to be submitted may be obtained from either the student's faculty adviser or the Office of the Dean of the Graduate School of Nutrition.

The written report of the special research problem and the final oral examination must be completed by the deadline set by the Graduate School in order to graduate the same term. Degrees are conferred in January, June, and September of each year.

Orientation Requirements

Prior to registration all new M.N.S. candidates are requested to attend an orientation



program which includes an introductory meeting, a tour of Savage Hall, and meetings with the core faculty professors.

During this orientation each student will meet individually with an advisory committee of three or four faculty professors who will help him formulate his academic program for the fall term according to his previous experience, future goals, and the required curriculum for graduation. These interviews last for about a half hour per student.

Also during the orientation program each of the core faculty professors and representatives from the joint faculty will meet with the group of new students to discuss his specialization in nutrition and to describe his current research programs. With the same purpose in mind, each student is encouraged to arrange throughout the first term subsequent meetings with other joint faculty members. The student must choose his adviser and specialization by mid-October. The selected adviser will direct the student's research problem and assume the advisory committee's duties of formulating the student's curriculum for the M.N.S. degree.

Residence Requirements

Residence will vary with the candidate's background, training, and experience. To receive a degree from the Graduate School of Nutrition a student must complete at least two units of residence at the School after receiving a bachelor's degree from Cornell or another accredited school or university. Full-time study for one semester with satisfactory accomplishment constitutes one residence unit. In most instances the time required to obtain the degree exceeds the minimum requirements and generally takes two academic years plus the intervening summer.

Tuition and Fees

Registration Fee

A registration fee of $50 must be made by every applicant accepted for admission unless the candidate has previously matriculated as a student at Cornell University. A check or money order payable to Cornell University should be remitted to the Graduate School, Sage Graduate Center, upon notification of acceptance. This fee pays the matriculation fee, chest x-ray fee, and examination book charge and covers certain expenses incurred at graduation if the student receives a degree. No refund will be made to any candidate who withdraws his application after May 10, or after fifteen days following his admission approval. This fee is *not* covered by University fellowships, scholarships, or assistantships.

In Absentia

A graduate student registered *in absentia* must pay a fee of $35 each term.

Tuition

The tuition for students registered in the Graduate School of Nutrition is $1400 per year payable at the beginning of the term. Certain assistantships carry a waiver of tuition. Tuition contributes toward the services supplied by the libraries, Gannett Clinic, Sage Infirmary, the student union in Willard Straight Hall, and pays a portion of the extra cost of laboratory courses and general administration.

Summer Session Fee

All students of the Graduate School of Nutrition who attend classes or do research in the Summer Session must register both in the Graduate School and in the Summer Session in order to receive credit. Registration forms are provided by the Office of the Registrar and administered by the Office of the Summer Session. The rate of tuition is $75 for each credit hour.*

Limited Refunds

Limited refunds of the tuition will be made to students who withdraw from the University prior to completion of a term for reasons accepted as satisfactory. If a student terminates a University registration, tuition will be charged beginning with registration day to the effective date of the certificate as issued by the school as follows: first week, 10 percent; second week, 20 percent; third week, 30 percent; fourth week, 40 percent; fifth week, 60 percent; sixth week, 80 percent; seventh week, 100 percent; except no charge is made if the withdrawal is effective within the first six days of the term including registration day. However, the charge

* This figure is the 1972 figure and is likely to change.

will be made according to the number of instructional days elapsed if a student leaves for one of the following reasons: completion of degree requirements, military service, or on recommendation of the University Health Services. No part of the registration fee is refundable to a student who arranges for withdrawal at the Graduate School Office in Sage Hall after fifteen days following his admission approval.

Students registering at any time during the last ten weeks of any term pay at the rate of 10 percent of the regular tuition for the term for each week or fraction thereof from the day of registration through the last examination day of the term.

The amount, time and manner of payment of tuition, fees, or other charges may be changed by the Board of Trustees at any time without previous notice.

Financial Support

Assistantships and Traineeships

A number of assistantships are available in the School's research programs for which any student admitted to the School may apply. There are also traineeships available to U.S. citizens who intend to continue graduate work toward a Ph.D. degree using the M.N.S. as an intermediary step. Applications should be made in writing to the Secretary, Graduate School of Nutrition. No special application forms are provided. The term and stipend for each appointment are determined on an individual basis after the student has been accepted by the Graduate School. *Applications should be made by March 1,* for September appointments. Announcement of appointments will be made on or about April 1. (Late applications will be considered.)

Traineeships in Public Health

Students interested in preparing for positions as public health nutritionists may apply for public health traineeship awards from the United States Public Health Service. Applicants may secure application forms and additional information from any of the regional medical directors of the United States Public Health Service or from:

Chief, Health Manpower Grants Branch
Division of Health Manpower Educational Services
Public Health Service, DHEW
Bethesda, Maryland 20014

Cornell Graduate Fellowship Board

The Cornell Graduate Fellowship Board has an application deadline of February 1, but this date does *not apply* to the Graduate School of Nutrition Assistantships and Traineeships.

Extensive financial resources are available to help Cornell graduate students with educational costs. Currently, approximately 2,900 of the 3,400 graduate students receive financial aid in the form of fellowships, teaching assistantships, and research assistantships. However, the amount of support available from outside the University is contracting sharply, so the number of students with fellowships or assistantships is expected to decrease. More than 300 fellowships are under the direct supervision of the Fellowship Board.

A fellowship ordinarily is awarded in open competition to a full-time student who is a candidate for a higher degree (usually a Ph.D.), primarily on the basis of scholastic ability and promise of achievement.

For further information regarding graduate financial assistance please refer to the *Announcement of the Graduate School.*

Health Services and Medical Care

Health services and medical care for students are centered in two Cornell facilities: the Gannett Medical Clinic (outpatient department) and the Sage Infirmary.

Students are entitled to unlimited visits to the Clinic. Appointments with individual physicians at the Clinic are encouraged and may be made by calling or by coming in person. An acutely ill student will be seen promptly whether he has an appointment or not. Students are also entitled to most laboratory and x-ray examinations indicated for diagnosis and treatment when prescribed by University physicians, hospitalization in the Sage Infirmary with medical care for a maximum of fourteen days each semester, and emergency surgical care. The cost of these services is covered by tuition.

On a voluntary basis, insurance is available to supplement the services provided. For further details, including charges for special services, see the *Announcement of General Information.*

If, in the opinion of the University author-

ities, the student's health makes it unwise for him to remain in the University, he may be required to withdraw.

Graduate Housing

Detailed information on all types of housing for students may be obtained by writing to the Department of Student Housing and Dining Services, 223 Day Hall, Cornell University, Ithaca, New York 14850.

Residence Halls

The University has two residence halls for graduate students. The Sage Graduate Center accommodates 190 men and women; Cascadilla Hall houses 160 men and women. The dining service in the Sage Graduate Center is available to all graduate students and faculty.

Married Students

Unfurnished apartments for 420 married students and their families are provided by Cornell in the Cornell Quarters (81 apartments), Pleasant Grove Apartments (94 units), and Hasbrouck Apartments (245 units).

Off-Campus Housing

Information on housing that is currently available may be obtained at the Housing Services Office in Day Hall. Because changes of available accommodations occur daily, it is not practical to prepare lists. If possible, a student should make at least one trip to Ithaca to look over the available apartments and houses before he plans to take up residence. Since the demand for housing is very high this should be done as early as possible.

Undergraduate Advisory Service

A Cornell undergraduate in the College of Agriculture, Arts and Sciences, or Human Ecology who is interested in graduate work in nutrition may obtain guidance in planning his undergraduate curriculum from members of the faculty of the Graduate School of Nutrition. Courses are recommended by the adviser to provide the undergraduate with the best background for continuing in the M.N.S. degree program in his chosen area of specialization in nutrition.

Foreign Students

The University maintains an International Student Office. Foreign students are invited to write to that Office for any information they may need, or to consult the staff about any problems they may have.

Foreign students are requested to report to the International Student Office, 200 Barnes Hall, when they arrive at Cornell.

Course Descriptions

The following list of courses includes both those specified previously as required for the degree offered and some of those from which the student may select electives, with the approval of his faculty adviser, in accordance with his specific area of interest.

The following courses are offered by the Graduate School of Nutrition:

Course	*Page*
Intermediate Human Physiology (570)	28
International Nutrition Problems, Policy, and Programs (580)	25
Food Economics (590)	30
Field of Nutrition Seminar (619)	25
General Nutrition (620)	24
Clinical and Public Health Nutrition (650)	25
Special Topics in Nutrition (660)	25
Seminar in Nutrition and Behavior (690)	25
Nutrition Seminar (700)	25
Special Problem (710)	13

The information in parentheses following the name of the course refers to the department or the division in which the course is given, and the course number. In registering for any course, list the course number and the department or division, rather than the name of the course. The times and rooms for courses are not always available at printing. To obtain course times and rooms the student should consult the specific departmental office, the individual *Announcements* issued by the colleges concerned, or the Cornell University Course and Room Roster available at registration. Information in brackets indicates that the course is not offered in 1972 or 73 or both.

Animal Nutrition

See p. 28.

Biochemistry, Chemistry and Physics

Basic Biochemical Methods (Biological Sciences 430). Either term. Credit four hours each term. Prerequisite: 431 and permission of the instructor. Laboratory, lecture-discussion M T W or Th (two four-hour periods per week). 225 Stimson, J. M. Fessenden-Raden and R. Alexander.

Students must preregister with instructor by April 6, for fall term and Nov. 2, for spring term.

A modular course designed to meet the practical biochemical needs of students concentrating in other disciplines. Choice of modules emphasizing clinical biochemistry, nutritional biochemistry, plant biochemistry, analytical biochemistry, and ecological problems will be offered. Students in course 430 will go into more depth and will complete more modules than students in course 330.

Principles of Biochemistry (Biological Sciences 431). Either term. Credit four hours. Prerequisite: Organic Chemistry 353 or the equivalent. Fall term lectures, M T Th S 8. 120 Ives. Staff. Spring term lectures, M W F S 10:10. 233 Plant Science. S. J. Edelstein.

A basic course dealing with the chemistry of biological substances and their transformation in living organisms.

Intermediate Biochemical Methods (Biological Sciences 530). Either term. Credit four hours. Prerequisite: Chemistry 358 and 431 or concurrent registration in 532. Laboratory T or Th 9:05–4:25. Discussion period to be arranged. W. L. Nelson and R. E. McCarty.

Intended for undergraduates majoring in biochemistry and for graduate students with a minor in biochemistry. Preregistration must be made with an instructor by Nov. 15.

Selected experiments on carbohydrates, proteins, amino acids, and metabolism (cellular particulates, kinetics, general enzymology) will

be given to illustrate basic biochemical principles. The course will emphasize the quantitative aspects rather than qualitative identifications.

Intermediate Biochemistry (Biological Sciences 531–532). 531 fall term only; 532 spring term only. Credit four hours each term. Prerequisite: Chemistry 357–358 and 431 or consent of instructor. Physical Chemistry highly desirable. Lectures M W F S 9:05. Examinations, optional background or advanced lectures, and discussion sections may be scheduled on Th evenings. Fall term, J. K. Moffat; spring term, P. C. Hinkle.
The major areas of biochemistry and molecular biology will be covered in detail. Fall term: proteins and the nature of enzymatic catalysis; biosynthesis of informational macromolecules. Spring term: carbohydrate, nitrogen, and lipid metabolism; bioenergetics.

Biochemistry of the Vitamins and Coenzymes (Biological Sciences 534). Spring term. Credit two hours. Offered in alternate years. Prerequisite: Chemistry 353 and course 431 or their equivalent. Lecture, T Th 10:10. 100 Savage. D. B. McCormick.
The chemical and biochemical aspects of vitamins and coenzymes.

Basic and Applied Science Coordination Course in Biochemistry. (Biological Sciences 537). Fall and spring terms. Credit one hour. Prerequisite: 431 or equivalent. T 7:30–9:00 p.m. 100 Savage. E. Racker.
Series of lectures and seminars of problems of basic and applied biochemistry and its coordination. Enrollment is limited to graduate students in the biological sciences.

Research Seminar in Biochemistry (Biological Sciences 631–632). Fall and spring terms. Credit one hour each term. S/U grades only. M 7:30–9 p.m. 100 Savage. P. C. Hinkle.
Required of all graduate students (first-year students excepted) majoring in biochemistry. The course may be repeated for credit.

Biochemistry Seminar (Biological Sciences 639). Fall and spring terms. No credit. F 4:15. 204 Stocking. Faculty.
Lectures on current research in biochemistry presented by distinguished visitors and staff.

Introductory Quantitative Analysis (Chemistry 236). Fall term. Credit four hours. Enrollment limited. Prerequisite: Chemistry 108 or advanced placement in chemistry. Lectures, T Th 12:20. Laboratory, M W or T Th 1:25–4:25, or F 1:25–4:25 and S 8–11, if warranted by sufficient registration. Preliminary examinations may be given in the evening.
A study of the fundamental principles of quantitative chemistry. Laboratory experiments are designed to illustrate basic principles and practice of quantitative procedures.

Introductory Physical Chemistry (Chemistry 287, fall; 288, spring). Credit three hours a term. Prerequisites: Chemistry 108 or 116 and Mathematics 111–112 or consent of the instructor. Chemistry 287 is prerequisite to 288. Lectures, W F 9:05; occasional lectures and examinations, M 9:05. Recitation, M W or F 1:25. Fall, E. L. Elson; spring, R. E. Hughes.
A systematic treatment of the fundamental principles of physical chemistry.

Introductory Organic Chemistry (Chemistry 357–358). Throughout the year. Credit three hours a term. Prerequisite: Chemistry 108 or 116, or advanced placement in chemistry. Chemistry 357 is prerequisite to Chemistry 358. Parallel registration in Chemistry 355–356 is recommended. Lectures, M W F 9:05. Preliminary examinations may be held in the evening.
A systematic study of the more important classes of carbon compounds, reactions of their functional groups, methods of synthesis, relations, and uses.

Selected Topics in Organic Chemistry (Chemistry 570). Fall term. Credit three hours. Lectures T Th 12:20, one hour meeting to be arranged. Course is divided into two sections. Both sections must be completed for three hours credit. The topics to be announced. M. F. Semmelhack, A. G. Schultz.

General Physics (101–102). 101, fall; 102, spring. Credit four hours per term. Prerequisite: three years of high school mathematics including some trigonometry. Course 101 (or 112 or 207) is prerequisite to 102. Includes more modern physics and less mathematical analysis than 207–208 or 112–213; but more mathematical analysis than 201–202. Students who plan to major in a physical science should elect physics 207–208 or 112 and 213–214. An audio-tutorial (A–T) format of instruction will be used, allowing students to work in a learning center at hours of their own choice. Large group meetings, W F 9:05 or 11:15. Two discussion periods per week to be arranged. A. J. Sievers and staff.

Advanced Biochemistry

Lectures and seminars presented throughout the year on specialized topics; three topics each term. Credit one hour each topic. Prerequisite: 532 or consent of instructor. May be repeated for credit. The following fields will be covered. Enzyme Structure and Mechanism of Action (Fall 1974); Aspects of Protein and Nucleic Acid Synthesis (Spring, 1975); Structure, Function, and Synthesis of Biological Membranes (Fall, 1973); Structure and Function in Metabolic Systems (Spring, 1974).

Structure of Biological Membranes (Biological Sciences 633). Fall term 1973. First four and one half weeks of term. T Th 9:05. 100 Savage. D. B. Zilversmit.

Structure and Function of Mitochondrial and Chloroplast Membranes (Biological Sciences 635). Fall term 1973. Middle four and one half weeks of term. T Th 9:05. 100 Savage. E. Racker.

Biogenesis of Membranes (Biological Sciences 637). Fall term 1973. Last four and one half weeks of term. T Th 9:05. 100 Savage. G. Schatz.

Regulatory Aspects of Photosynthesis (Biological Sciences 634). Spring term 1974. First four and one half weeks of term. T Th 9:05. 100 Savage. R. E. McCarty.

Crystallography of Macromolecules (Biological Sciences 636). Middle four and one half weeks of term. T Th 9:05. 100 Savage. J. K. Moffat.

Chemistry of Nerve Transmission (Biological Sciences 638). Last four and one half weeks of term. T Th 9:05. 100 Savage. G. P. Hess.

Biological Sciences

Courses are listed under Biochemistry, Chemistry, and Physics; Food Science and Microbiology; and Physiology and Physical Biology.

Economics and Food Marketing

See Social Sciences, p. 30.

Food Science and Microbiology

International Food Science and Development (Food Science 403). Fall term. Credit three hours. Lectures, M W 2–4:25. Offered in odd years. 119 Stocking. F. V. Kosikowski.
An exploration of the elements and characteristics of International Food Science and a study of the development, processing, and marketing of staple and exotic foods throughout the world. Proposals for increasing world protein resources for the human are to be discussed. Special attention is given to the organization, operations, relationships, and contributions of United Nations technical agencies, FAO, UNICEF, WHO, and governmental and nongovernmental organizations in the field.

Protein and Food Enzymes (Food Science 501). Fall term. Credit three hours. Lectures, M W F 12:20. 119 Stocking. Offered in odd years. D. V. Vadehra.
The first part of the course will deal with the general properties of proteins: structure, preparation, and reactions. The second part will deal with proteins as part of food systems, occurrence and composition, associations and structures, and reactions to processing.

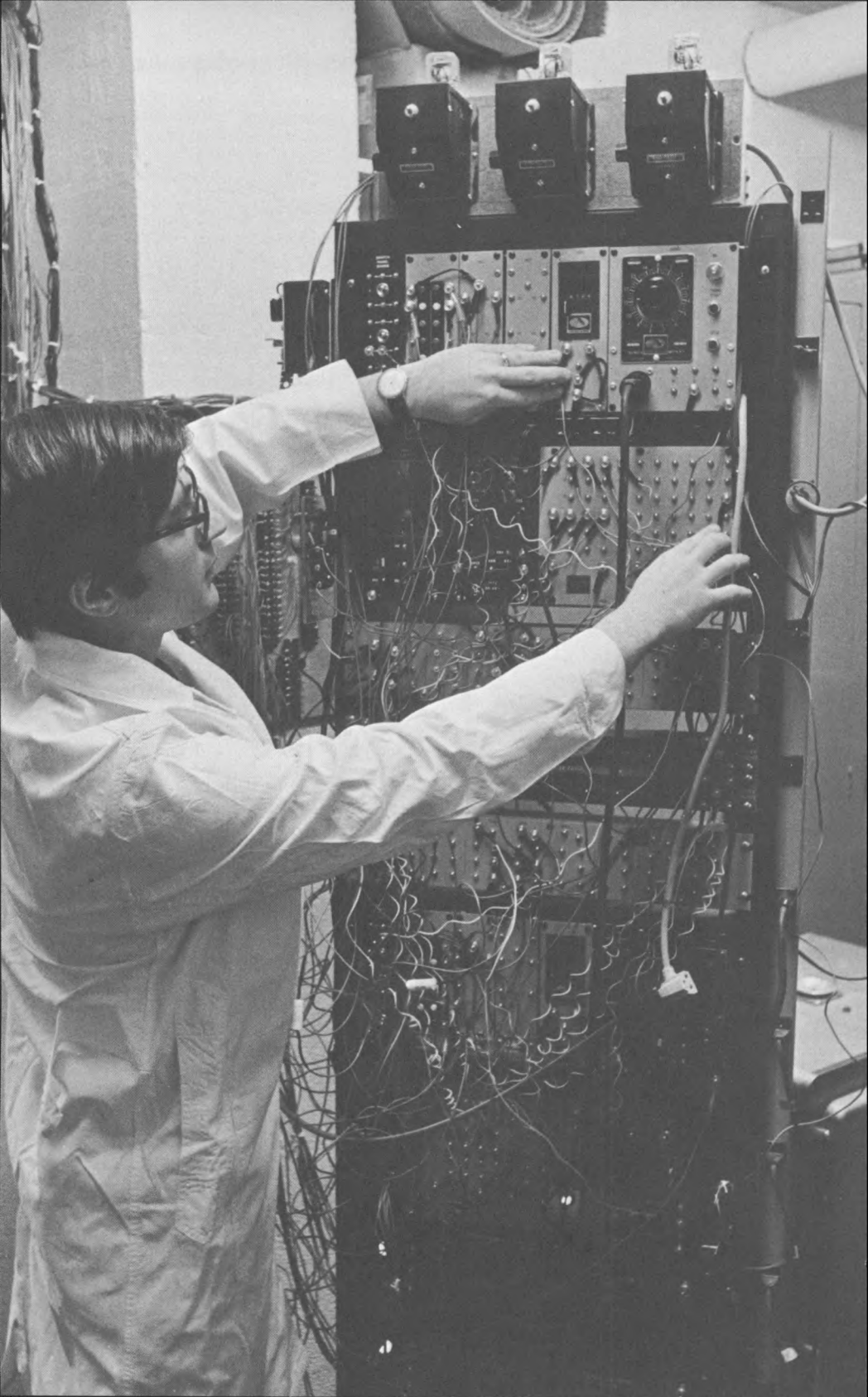
[Food Lipids (Food Science 502). Fall term. Credit two hours. Open to graduate students. Lectures, W F 8. Offered in even years. J. E. Kinsella. Not offered in 1973.
Covers the disposition of lipid materials in foods and the manner in which lipids influence the chemical and physical attributes of various foods. The effects of production techniques, storage, heating, refrigeration and enzymes on food lipids are described, and the chemical mechanisms involved are elucidated. The importance of lipids in the formation of food flavors is discussed.]

[Food Carbohydrates (Food Science 503). Spring term. Credit two hours. Prerequisite: Biological Sciences 431 or the equivalent. Offered in even years. T Th 10:10. 120 Stocking. L. F. Hood.
A consideration of the chemistry of carbohydrates in foods including sugars, starches, pectins, gums, and cellulose. Emphasis will be placed on their origin in raw materials and the subsequent changes occurring during processing and storage.]

Physiochemical Aspects of Food (Human Nutrition and Food 446A). Fall term. Credit three hours. Prerequisites: Human Nutrition and Food 246 and a college course in biochemistry. Lectures, T Th 12:20. E. Hester.
The relation to food quality of *(a)* rheological properties of food systems, *(b)* oxidation and reduction reactions, *(c)* enzymatic and nonenzymatic browning. Physical and chemical factors accounting for the color, flavor, and texture of natural and processed foods.

Physiochemical Aspects of Food, Laboratory (Human Nutrition and Food 446B). Fall term. Credit one hour. Prerequisite or concurrent: Human Nutrition and Food 446A. Laboratory, Th 1:25–4:25. G. Armbruster.
Laboratory experiments designed to illustrate the effect of varying ingredients and treatment on the quality characteristics of food products. Objective testing methods are used to determine food quality characteristics.

Physiochemical Aspects of Food, Laboratory (Human Nutrition and Food 446C). Fall term. Credit one hour. S/U option. Enrollment limited to 16 in each section. Prerequisite or concurrent: HNF 446A. Laboratory M or Th 1:25–4:25. G. Armbruster.
Laboratory experiments designed to illustrate *(a)* the physiochemical behavior of colloidal systems; *(b)* chemical reactions of some food components; *(c)* effects of temperature, pH, moisture, inorganic salts, and enzymes on physiochemical changes in natural foods, food components, and food mixtures.



Instrumental Methods (Food Science 506). Spring term. Credit five hours. Prerequisite: permission of the instructor. Lecture, M W F 11:15. 119 Stocking. Laboratory, M or T 1:25–4:55. J. W. Sherbon.
Deals with instrumental methods widely used in research and industry. The major emphasis is on chromatography, spectroscopy, electrophoresis, ultracentrifugation, thermal analysis, and the use of computers. The stress will be on the practical use of the material presented.

Food Science Seminar (Food Science 600). Fall and spring terms. Time to be arranged. 204 Stocking.

General Microbiology Lectures (Biological Sciences 290A). Fall or spring term. Credit three hours. Prerequisites: 101–102 or equivalent and chemistry 104, 108, or the equivalent. Recommended to take 290B concurrently. Lectures M W F 11:15. 146 Morrison. Fall term, H. W. Seeley; spring term, P. J. VanDermark.

General Microbiology Laboratory (Biological Sciences 290B). Fall or spring term. Credit two hours. M W 2–4:25; T Th 8–11 or 2–4:25. 301 Stocking. Fall term, H. W. Seeley; spring term, P. J. VanDermark.

Natural Selection in Bacteria (Biological Sciences 391A). Fall term. Credit three hours. Prerequisite: 290 and 431 or consent of the instructor; 431 may be taken concurrently. Lectures M W F 9:05. 105 Riley-Robb. R. E. MacDonald.
A study of the comparative physiological and ecological relationships among bacteria and some related organisms. A number of groups of bacteria will be discussed in detail as well as factors which influence their ability to survive in nature. Parasitism, autotrophy, and evolution will be among the major topics discussed.

Bacterial Ecology Laboratory (Biological Sciences 391B). Fall term. Credit three hours. Prerequisites: concurrent registration in 391A and permission of the instructor. Limited enrollment. M W F 1:30–4. R. E. MacDonald.
Techniques for the isolation, cultivation, and detailed study of selected groups of organisms. Some of the more standard techniques of physiological study will be introduced.

Food Microbiology (Biological Sciences 394). Spring term. Credit four hours. Prerequisites: Biological Sciences 290A and 290B. Graduate students must have permission of the instructor. Lectures, M W 12:20. 120 Stocking. Laboratory M W 2–4:25. 301 Stocking. H. Naylor.
The major families of microorganisms of importance in dairy and food science are studied systematically with emphasis on the role played by these organisms in food preservation, food fermentation, and public health. The laboratory work includes practice in the use of general and special methods of microbiological testing and control of dairy and food products and practice in the isolation and characterization of organisms found in foods.

Human Nutrition

See p. 25.

Mathematics, Statistics, and Research Design

Calculus (Mathematics 111). Either term. Credit three hours. Prerequisite: three years of high school mathematics, including trigonometry. Lectures, fall term: T Th 11:15, 12:20, plus one hour to be arranged. Lectures, spring term: T Th 12:20 plus one hour to be arranged.
Plane analytical geometry, differentiation and integration of algebraic and trigonometric functions and applications.

Calculus (Mathematics 112). Either term. Credit three hours. Prerequisite: Mathematics 111. Lectures, fall term: T Th 12:20 plus one hour to be arranged. Lectures, spring term: T Th 11:15 and 12:20 plus one hour to be arranged.
Differentiation and integration of elementary transcendental functions. The technique of integration, conic sections, polar coordinates, and infinite series.

Design of Survey Samples (Industrial and Labor Relations 310). Spring term. Credit three hours. Prerequisite: one term of statistics.
Application of statistical methods to the sampling of human populations. A thorough treatment of the concepts and problems of sample design with respect to cost, procedures of estimation, and measurement of sampling error. Analysis of nonsampling errors and their effects on survey results (e.g., interviewer bias and response error). Illustrative materials will be drawn from the areas of market research and attitude and opinion research.

Elementary Statistics (Mathematics 370). Fall term. Credit four hours. Prerequisites: 112, 122, 192 or 108 and consent of instructor. M W F 12:20.
Topics in probability which are essential to an understanding of statistics: introduction to the principles underlying modern statistical inference and the rationale underlying the choice of statistical methods in various situations. This is a terminal course intended for those who will take no further work in this area.

Statistical Methods I (Statistics and Biometry 510). Fall term. Credit four hours. Prerequisite: graduate standing or permission. Lectures, M W F 9:05. Laboratory to be arranged. Ex-

aminations will be held at 7:30 p.m. on Wednesday evenings. R. R. Davidson.
The use of probability models to portray the variations of observations arising through experimentation in biology. Particular attention is given to the binomial, the Poisson and the normal probability models. Techniques developed in utilizing the information contained in observations arising from a specific population to make inferences about characteristics of the populations.

Statistical Methods II (Statistics and Biometry 511). Spring term. Credit four hours. Prerequisite: Statistics and Biometry 510 or the equivalent. Lectures, M W F 9:05. Laboratory to be arranged. Examinations will be held at 7:30 p.m. on Wednesday evenings. R. R. Davidson.
The work of Statistics and Biometry 510 is continued. Topics include multiple and curvilinear regression, complex analyses of variance and covariance. The analysis of variance discussion considers treatment designs; single degree of freedom contrasts; the simpler experimental designs; sampling errors; fixed, mixed, and random models; and the effect of disproportionate numbers. When appropriate, the computer is considered as the reasonable way to have calculations done.

Economic and Social Statistics (Industrial and Labor Relations 510). Fall and spring terms. Credit three hours.
A nonmathematical course for graduate students in the social studies without previous training in statistical methods. Emphasis will be placed on discussion of technical aspects of statistical analysis and on initiative in selecting and applying statistical methods to research problems. The subjects ordinarily covered will include analysis of frequency distributions, regression and correlation analysis, and selected topics from the area of statistical interference.

[Research Design and Analysis in the Social Sciences (Consumer Economics and Public Policy 501). Spring term. Credit two hours. Prerequisites: introductory statistics and permission of the instructor. Lectures, W 2:30–4:25. Not offered in 1972.
The course is a general introduction to the design and analysis of research. The emphasis will be on survey research methods for social and economic studies.]

Introduction to Computer Uses in Data Analysis (Rural Sociology 440). Fall and spring terms. Credit three hours. S/U option. Prerequisite: one course in statistics or permission of the instructor. T Th 11:15. Laboratory to be arranged. 345 Warren. D. E. Moore.
An introductory course for students who wish to use the computer in research. The course is divided into two parts. The first part is designed to give students a working knowledge of the elementary aspects of Fortran IV so that they will be able to do preliminary transformations of data and simple Fortran programs. The second part deals with the various canned programs which are most often used by social scientists. Students are introduced to program packages such as Michigan, Bimed, and SPSS. Examples will be given on how to run the programs and there will be discussions on the differences between them.

Research Design II (Rural Sociology 515). Spring term. Credit three hours. Prerequisite: an introductory methods course or a statistics course. M W F 10:10. 232 Warren. J. D. Francis.
An intermediate level treatment of nonexperimental designs, regression analysis, analysis of variance, analysis of covariance, and causal models. A classic piece of sociological research will be one source of illustration and laboratory exercises.

Macrostructural Research Methods (Rural Sociology 516). Spring term. Credit four hours. T Th 2:30–4:10. 201 Warren. R. C. Young.
The comparative study of large social systems is presented as a new research style that is especially appropriate to research in and on developing countries. The field techniques of macrosurveys and the uses of available data such as national social accounting, documents, ethnographic reports, and aerial photographs are emphasized. Special attention is given to trend studies, the assumptions of macrostructural analysis, rapid low-cost research procedures, and the mechanics of data archives.

Microbiology

See p. 23.

Nutrition

In this area some courses are more oriented toward human nutrition and others are more oriented toward animal nutrition. Since courses based on experimental animal nutrition are often fundamental to a knowledge of human nutrition, a clear-cut distinction is not implied in the following course groupings.

General

General Nutrition (Graduate School of Nutrition 620). Fall term. Credit three hours. Prerequisite: permission of the instructor. V. Simko.
This course is offered to students whose principal academic training has been in a field other than nutrition. It is designed to meet their need for a basic but intensive in-

troduction to the principles, history, and applications of nutrition.

Special Topics in Nutrition (Graduate School of Nutrition 660). Throughout the year. Maximum of three credit hours each term. Registration by permission of the instructor. Graduate School of Nutrition faculty.
Designed for the student who wishes to become well informed in any specific topic he selects which is related directly or indirectly to nutrition. The course may include individual tutorial study, experience in research laboratories, a lecture series on a special topic selected by a professor or a group of students, and/or selected lectures of a course already offered. Topics can be changed so that the course may be repeated for credit.
The Admissions Counseling Committee must give approval for Advanced Nutrition Credit.

Seminar in Nutrition and Behavior (Graduate School of Nutrition 690). Spring term. Credit three hours. Registration by permission. F 2:30–5:30. 130 Savage. D. Levitsky.

Special Problem (Graduate School of Nutrition 710). Throughout the year. Six credit hours. Report of an individual problem under the direction of any member of the faculty of the Graduate School of Nutrition. (See p. 13 for details.)

Advanced Nutrition Series

A series of nutrition courses offered jointly by the Department of Human Nutrition and Food, College of Human Ecology; the Departments of Animal Science and of Poultry Science, College of Agriculture; and the Graduate School of Nutrition. Prerequisites: courses in nutrition, physiology, and biochemistry to include intermediary metabolism; or permission of the instructor.

The biochemical and physiological bases of digestion, absorption, transport and metabolism of nutrients; species differences where applicable; and historical as well as current concepts in nutrition.

Proteins and Amino Acids (Human Nutrition and Food 501). Fall term. Credit two hours. Lectures, W F 10:10. NG-6 Van Rensselaer. M. Morrison.

Lipids and Carbohydrates (Poultry Science 502). Fall term. Credit two hours. Lectures, T Th 11:15. 300 Rice. A. Bensadoun.

Nutritional Energetics (Animal Science 503). Spring term. Credit two hours. Lectures, M W 10:10. 342 Morrison. J. T. Reid.

Vitamins and Minerals (Poultry Science 504). Spring term. Credit two hours. Lectures, T Th 11:15. 300 Rice. M. L. Scott.

[Pathology of Nutritional Diseases (Veterinary Pathology 931). Spring term. Three credit hours. Prerequisite: Veterinary Pathology 630 and 631. Lecture and laboratory hours to be arranged. Designed primarily for graduate students of nutrition. Offered in even years. L. Krook.]

Nutrition Seminar (Graduate School of Nutrition 700). Fall and spring terms. Credit one hour. S/U grades only. Time to be arranged. Intended primarily for Graduate School of Nutrition students. Attendance throughout the year is recommended. R. H. Barnes and faculty.

Field of Nutrition Seminar (Graduate School of Nutrition 619; also Animal Science 619 and Poultry Science 619). Fall and spring terms. No credit. M 4:30. Fall term, 348 Morrison. Spring term, 100 Savage.
Lectures on current research in nutrition presented by visitors and faculty.

Human Nutrition

International Nutrition Problems, Policy, and Programs (Graduate School of Nutrition 580). Fall term. Credit three hours. Registration by permission. Lectures, T Th 11:15–12:45. 130 Savage. M. Latham.
A review of food and nutrition problems, policy, and programs especially as they relate to developing countries. Emphasis is placed on the need to coordinate the efforts of various government ministries or departments including those of agriculture, education, economics, health, and community development. Among topics discussed are planning and evaluation of applied nutrition programs; education and training in nutrition; the importance of social and cultural factors; methods of increasing the use of protein-rich foods; assessment of nutritional status; the role of FAO, WHO, UNICEF, and other agencies; action in case of famine; the integration of nutrition with other projects of disease control in developing countries.

Clinical and Public Health Nutrition (Graduate School of Nutrition 650). Spring term. Credit three hours. Prerequisites: a course in nutrition, in physiology, and in biochemistry. Registration by permission of the instructor. For graduate students only. Lectures to be arranged. C. M. Young and D. Roe.
Designed to familiarize the student with some of the applications of nutrition to clinical and public health problems.

Maternal and Child Health Nutrition (Human Nutrition and Food 222). Fall and spring terms. Credit three hours. Prerequisite: Human Nutrition and Food 115A. Human nutrition and food majors electing this course must do so before taking Human Nutrition and Food 231. Lectures and discussion, M W F 1:25. Van Rensselaer. K. Newman.
Nutritional needs during human growth and reproduction: relationship between nutrition and child health; meeting the dietary needs of

women during the reproduction period and the needs of infants and children.

Seminar in Food and Human Nutrition (Human Nutrition and Food 605). Fall and spring terms. Credit one hour. T 4:30. NG-35 Van Rensselaer. D. Sanjur and N. Mondy.

Physiological Bases of Human Nutrition (Human Nutrition and Food 231). Fall term. Credit four hours. S/U option. Enrollment limited to forty. Prerequisites: HNF 115, Chemistry 103–104 or equivalent. Bio. Sci. 101–101L. Lecture, M W F 9:05. K. Newman, R. Schwartz, and M. Devine.

Human nutrition with emphasis on the physiological processes involved in maintenance of a constant internal environment. Study of specific nutrients and nutrient groups and their utilization as affected by nutrient-host environmental interrelationships.

Human Nutrition (Human Nutrition and Food 431). Spring term. Credit three hours. S/U option. Prerequisites: HNF 231 or equivalent and biochemistry. M W F 8 a.m.

Biochemistry of human nutrition will be covered in the context of physiological systems. Emphasis on interrelation among nutrients in metabolism; the effect of biochemical and physiological processes and environmental factors which may alter nutrient requirements.

Nutrition and Disease (Human Nutrition and Food 441). Fall term. Credit three hours. Prerequisite: Human Nutrition and Food 431 or equivalent. Discussion, M W F 12:20. Van Rensselaer. J. Rivers.

Study of the physiological and biochemical anomalies in certain diseases and the principles underlying nutritional therapy. Independent survey of the technical literature in this field.

Community Nutrition and Health (Human Nutrition and Food 445A). Spring term. Credit three hours. S/U option. Prerequisites: HNF 231 and 246; beginning course in sociology recommended. Lecture, W F 11:15. Discussion T 1:25–4:25, or field trips to be arranged on several Tuesday or Thursday afternoons. Students may not receive credit for both 445A and B. K. Clancy-Hepburn.

Study of the environmental and political dimensions of human nutrition and health problems in contemporary society; application of basic concepts of food and nutrition to the improvement of man's health; and evaluation of federal, state and community programs focused on improving man's nutrition. Estimated cost of field trips $5.

Community Nutrition and Health (Human Nutrition and Food 445B). Spring term. Credit three hours. Prerequisites: HNF 246–431, beginning course in sociology recommended. Lecture, W F 11:15. Discussion Th 1:25–4:25 or field trips, T Th afternoons. Students may not receive credit for both 445A and B. K. Clancy-Hepburn.

Study of biochemical, environmental and political dimensions of human nutritional and health problems in contemporary society; application of more advanced concepts of food and nutrition to the improvement of man's health and evaluation of federal, state and community programs focused on improving man's nutrition. Estimated cost of field trips $5.

Nutrition and Growth (Human Nutrition and Food 512). Spring term. Credit two hours. Prerequisite: Human Nutrition and Food 231 or permission of instructor. Lectures, T Th 9:05. Van Rensselaer. K. Newman.

Aspects of human physical and chemical growth of particular interest to nutritionists. Survey of methodology; comparison of individual growth patterns of selected body dimensions with group patterns; consideration of some of the variables, including diet, which influence growth.

Special Topics in Nutrition (Human Nutrition and Food 510). Fall term. Credit one hour. Enrollment limited to fifteen. Time to be arranged. K. Clancy-Hepburn.

Reading and discussion of various areas pertinent to community nutrition including biochemistry, ecology, social psychology, and community organization.

Readings in Nutrition (Human Nutrition and Food 514). Fall term. Credit three hours. Prerequisite: Human Nutrition and Food 431 or equivalent. Lectures, T Th 11:15 and an additional hour to be arranged. D. Sanjur.

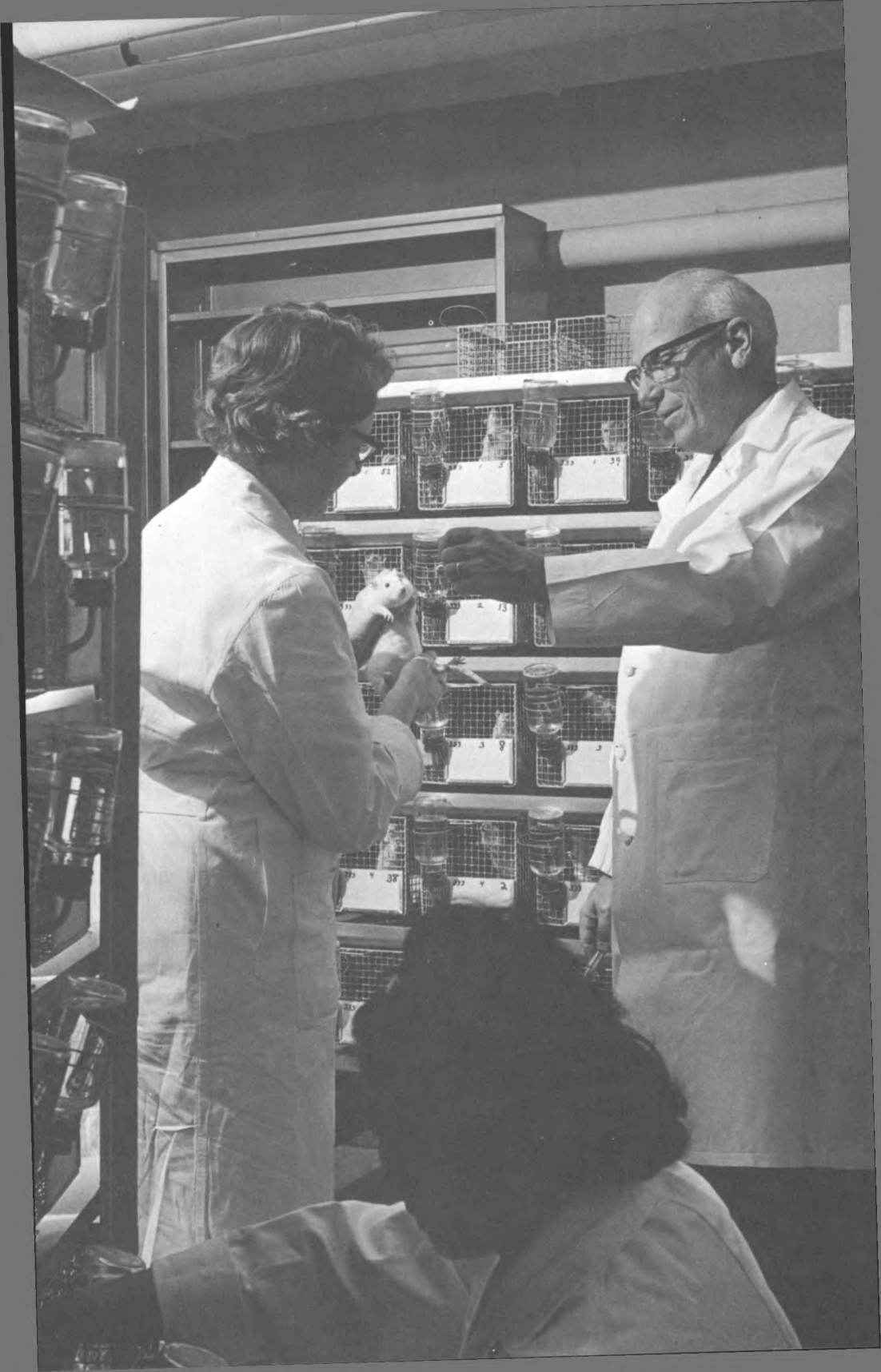
Critical review of literature on selected topics in the field of nutrition. Emphasis on human nutrition. Topics are changed each term so the course may be repeated for credit with permission of the instructor.

Seminar in Ecology of Human Nutrition and Food (Human Nutrition and Food 515). Spring term. Credit three hours. S/U grades optional. M W F 1:25 with an additional discussion period to be arranged. M. M. Devine.

An introduction to food and nutrition for graduate students who have had limited or no work in this area. The seminar utilizes the lecture and discussion of HNF 115 as a basis for supplementary readings and critical review of research on selected nutritional problems.

Research Methods in Human Metabolic Studies (Human Nutrition and Food 524). Spring term. Credit three hours. Prerequisites: Human Nutrition and Food 431 or equivalent, laboratory experience in biochemistry or quantitative analysis, and permission of the instructor. Lecture and laboratory, T Th 10:10–11:10. 353 Van Rensselaer. R. Schwartz.

Principles of human metabolic research; experimental design of human studies; dietary considerations; methods of collecting and analyzing biological material; and evaluation.



Laboratory will include planning and management of a metabolic study; collection and the appropriate analysis of blood, urine, and feces.

Animal Nutrition

Principles of Animal Nutrition (Animal Science 410). Fall term. Credit three hours. Prerequisites: a course in human or veterinary physiology and a course in organic chemistry or biochemistry, or permission of instructor. Lectures, M W F 10:10. 125 Riley-Robb. M. C. Nesheim; H. F. Hintz, and R. G. Warner.
The chemistry and physiology of nutrition and the comparative nutritive requirements of maintenance, growth, reproduction, egg production, and lactation.

Principles of Animal Nutrition, Laboratory (Animal Science 411). Fall term. Credit one hour. Must be concurrently registered in 410. Enrollment limited to twelve students. Registration by permission only. Time to be arranged. M. C. Nesheim; H. F. Hintz, and R. G. Warner.
Laboratory problems with animals will be designed to introduce the student to techniques of experimentation in nutrition.

Laboratory Work in Animal Nutrition (Animal Science 511). Fall term. Credit three hours. Prerequisites: quantitative analysis and Animal Science 410 or its equivalent, or permission of the instructor. Lectures, M W F 2–4:25. 342 and 443 Morrison. W. Pond.
Each student engages in a series of short research projects with experimental animals, such as rats, rabbits, and sheep. Both classical and modern techniques of animal experimentation are considered. The applications of biochemical methods to the solution of animal nutrition problems are stressed.

Physics

See p. 20.

Physiology and Physical Biology

Histology: The Biology of the Tissues (Biological Sciences 313). Fall term. Credit four hours. Prerequisites: a two-semester introductory biology sequence; comparative anatomy and organic chemistry or biochemistry desirable. Lectures, T Th 11:15. G-1 Stimson. Laboratory, T Th 2–4:25. 14–16 Fernow. W. A. Wimsatt.
A general course dealing with the biology of the tissues to provide the student with a basis for understanding the microscopic and fine structural organization of vertebrates and the methods of analytic morphology at the cell and tissue levels. The dynamic interrelations of structure, chemical composition, and function in cells and tissues are stressed.

General Animal Physiology, Lectures (Biological Sciences 410). Spring term. Credit three hours. Prerequisites: one year of biology and physics; courses in chemistry, organic chemistry, and biochemistry desirable. S/U option. Lectures, M W F 10:10. G-25 Stimson. E. L. Howland.
The principles of animal physiology are developed through consideration of the functioning of cells, tissues, and organs. Specific topics discussed include respiration, metabolism, circulation, excretion, chemical integration, muscle contraction, nerve action, and sensory reception. A quantitative, systems-theoretical approach is emphasized.

General Animal Physiology, Laboratory (Biological Sciences 410A). Spring term. Credit two hours. Prerequisite: Biological Sciences 410 or equivalent must be taken concurrently. Lecture, W 2, alternate weeks only. G-25 Stimson. Laboratory, T 8–11 or M T Th or F 1:25–4:25, alternate weeks, 306 Stimson. E. L. Howland.
Students are introduced to basic techniques utilized in the study of the physiology of animal tissues. Experiments cover topics dealing with respiration, properties of muscle, circulation, activity of nerves, and osmotic phenomena.

Intermediate Human Physiology (Graduate School of Nutrition 570). Spring term. Credit four hours. Prerequisite: a course in biochemistry or consent of the instructor. Lectures, M W F 9:05 plus weekly demonstrations to be arranged. D. Roe.
Lectures on the major functional systems of the mammalian body with special reference to man. Special topics will include the physiology of growth, pregnancy, aging, and adaptation to environmental change.

[Special Histology: The Biology of the Organs (Biological Sciences 412). Spring term. Credit four hours. Prerequisite: Biological Sciences 313, or consent of instructor. Enrollment limited to eighteen students. Lectures, W F 9:05. 14 Fernow. Laboratory, W F 2–4:25. 14 Fernow. Offered in odd years. W. A. Wimsatt.
A continuation of Biological Sciences 313. The microscopic and ultrastructural organization of the principal vertebrate organ systems are studied in relation to their development, functional interaction, and special physiological roles. Biological Sciences 313 and 412 together present the fundamental aspects of the microscopic and submicroscopic organization of the vertebrate body from a physiological perspective. The organization of the course involves student participation in "lecture-seminars" and the prosecution of independent project work

supplementary to the regular work of the laboratory. The latter enables students to gain practical experience with histological and histochemical preparative techniques.]

Mammalian Physiology (Biological Sciences 414). Spring term. Credit six hours. Registration by permission. Prerequisites: a year of biological sciences. Courses in biochemistry, histology, and gross anatomy desirable. Lectures, M W F 8. 167 Morrison. Discussion, S 10:10. 167 Morrison. Laboratory, M or W 1:25. 174 Morrison. W. Visek; A. Bensadoun, E. L. Gasteiger, W. Hansel.

A general course in mammalian physiology including circulation, respiration, digestion, metabolism, renal function, endocrinology, and the nervous system.

Introductory Physical Biology (Veterinary Medicine 311). Fall term. Credit three hours. Prerequisites: basic biology, chemistry and calculus or permission of instructor. M W F 10:10.

Fundamentals of Endocrinology (Animal Science 427). Fall term. Credit four hours. Prerequisite: a course in human or veterinary physiology, or consent of the instructor. Lectures, T Th S 10:10. 167 Morrison. Laboratory, T Th 2–4:25. W. Hansel.

A general course in the physiology of the endocrine glands, and the roles played by each hormone in the regulation of normal body processes. The laboratory work consists of a series of experiments designed to illustrate the basic principles of endocrinology.

Vertebrate Biochemistry Lectures (Veterinary Medicine 512). Fall term. Credit three hours. Prerequisite: Biological Science 431 or an equivalent course in general biochemistry. Offered for advanced undergraduates and graduate students. M W 9, F 8. D105 Veterinary College. J. Wootton and W. F. Arion.

Radioisotopes in Biological Research: Principles and Practice (Veterinary Physical Biology 921). Spring term. Credit four hours. Lectures, T Th 11:05. Laboratory, M T or W 1:30–5. Prerequisites: a course in quantitative chemistry and permission of instructor. F. W. Lengemann and staff.

Lectures, demonstrations, and laboratory on the fundamentals of atomic energy procedures and applications to biological research.

Biological Effects of Radiation (Veterinary Physical Biology 922). Fall term. Credit three hours. Lectures, T Th 10:10. Laboratory, Th 1:30–4:25. A. P. Casarett.

Lectures and demonstration on radiation physics, radiation chemistry, radiation effects at the cellular level, radiation effects in multicellular organisms, genetic effects of radiation, and radioprotective and radiomimetic substances.

[Biological Membranes and Nutrient Transfer (Veterinary Physical Biology 923). Spring term. Credit two hours. Prerequisites: animal or plant physiology, quantitative and organic chemistry, physics, and consent of instructor. Cellular physiology and elementary physical chemistry desirable. Offered in even years. R. H. Wasserman.

An introduction to elementary biophysical properties of biological membranes, theoretical aspects of permeability and transport, and mechanism of transfer of inorganic and organic substances across intestine, placenta, kidney, erythrocytes, bacteria, and other biological systems.]

[Functional Organization of the Mammalian Nervous System (Veterinary Physical Biology 924). Fall term. Credit six hours; three hour lecture, three hour laboratory. Even numbered years.]

Physiology, Biochemistry and Biophysics of Mineralized Tissues (Vet. Physical Biology 925). Credit two hours. Fall term. M F 10:10. C. Comar; R. A. Carradino, P. H. Craig, A. N. Taylor, R. H. Wasserman.

Introduction to the histology, anatomy, and pathology of bones and teeth, kinetics of calcification, factors affecting calcium and bone metabolism (parathyroid hormone, calcitonin, vitamin D, trace elements, etc.) bone seeking radionuclides, and calcium homeostatic mechanisms.

Comparative Anatomy of the Digestive Tract (Veterinary Medicine 901). Fall term. Credit one hour. Prerequisite: Veterinary or comparative anatomy or vertebrate morphology 900. Embryology and histology are recommended. W 9:05. R. E. Habel.

A general knowledge of the gross anatomy of each organ will be assumed. Emphasis will be placed on the micromacroscopic muscular and vascular architecture, the innervation, and the functional cytology of the epithelium.

Comparative Gastroenterology (Veterinary Medicine 919). Fall term. Credit three hours. Prerequisites: Courses in general mammalian physiology, biochemistry, and nutrition, and consent of instructor. D 117, Veterinary College. M T F 9:05. W. J. Visek, A. Dobson, L. Krook, S. F. Sellers, C. E. Stevens, R. H. Wasserman. Lectures will emphasize (1) functional comparison of digestion and absorption in mammalian carnivore, herbivore, and omnivore, and in avian species; (2) examination of various in vivo and in vitro preparations and procedures used to study the function or malfunction in this system; and (3) digestive tract diseases.

Biology and Society (Biological Sciences 201–202). Fall and spring terms. Credit two hours per semester. S/U credit only. M 8 p.m. Discussion periods (one hour) to be arranged. Staff and invited speakers.

A series of public lectures dealing with a variety of topics concerning man as an individual, man as a member of society, and man as a member of the community of life on earth. The lectures are open to students and nonstudent members of the Cornell community as well as to other Ithaca-area residents. The purpose of the discussion period is to permit students to explore lecture material or related topics in depth.

Social Sciences

Economics and Food Marketing

Food Economics (Graduate School of Nutrition 590). Spring term. Credit three hours. Lectures, M W F 11:15. 130 Savage. D. L. Call.

Designed for students who are interested in any aspect of the food industry. Emphasis is placed on the economics of food production, processing, marketing, and consumption. Attention is given to both the United States and international food problems in a systematic treatment of economic principles applicable to the food sector of any economy.

Marketing (Agricultural Economics 240). Spring term. Credit three hours. Lectures, M W F 11:15. One discussion period only during the first week of the term: M T W Th or F 2:30–4:25 or S 9:05–11. 45 Warren. D. C. Goodrich.

A study of how food products are marketed. Special attention is given to the consumption of food products, factors that affect consumption, market channels, operation of different marketing agencies, storage, transportation, packaging, product identification, advertising and promotion, buying, selling, and costs.

Agricultural Policy (Agricultural Economics 351). Fall term. Credit three hours. S/U option. Two lectures plus one discussion section each week. Lectures, T Th 9:05. Discussion sections, Th 11:15 or 1:25, or F 10:10. K. L. Robinson.

A review of the history of public policies affecting agriculture in the United States and an analysis of the economic effects of alternative farm policies or programs either proposed or adopted. Among the topics discussed are farm price support and surplus disposal programs, trade policies affecting agriculture, alternative measures to alleviate rural poverty, and farm politics.

Food Distribution (Agricultural Economics 441). Fall term. Credit four hours. Open to juniors, seniors, and graduate students. Lectures, M W F 10:10 and W 2–4:25. W. G. Earle.

A study of the structure and the competitive nature of the food industry. Particular attention is given to an analysis of the gross margin, expenses, earnings, and performance of food retailers. Government regulations with regard to mergers and buying and selling activities are examined. Leading food industry authorities frequently join the discussion session.

Food Merchandising (Agricultural Economics 541). Fall term. Credit two hours. Prerequisite: permission of instructor. Lectures, Th 2:30–4:25. 260 Warren. M. E. Brunk.

A seminar exploring alternative merchandising and promotional devices for food industry retailers and manufacturers. Special attention is given to identification and measurement of basic forces having an impact on consumer buying behavior.

Food Industry Management (Agriculture Economics 443). Credit three hours. M W F 10:10 and W 2–4:25. 245 Warren. W. G. Earle.

A case study approach is used to examine the application of management principles and concepts to operating problems of food retailers. Areas included are site selection, buying, merchandising, personnel administration, private label products, and financing expansion programs. Leading food industry specialists frequently join the discussion on Wednesday afternoons.

Economics of Food Marketing (Agriculture Economics 446). Spring term. Credit three hours. Open only to seniors. Enrollment limited to thirty. Prerequisites: 240 and Economics 311 or permission of instructor. M W F 9:05 or 11:15. 260 Warren. D. I. Padberg.

A study of the organization of the agricultural marketing system and the nature of competition developing therein. Food industry structure and performance are appraised in light of current theory. Public regulation of competition in food marketing is also covered.

Resource Economics (Agriculture Economics 450). Fall term. Credit three hours. Suggested prerequisite: Conservation 201 or consent of the instructor. Lectures, T Th 10:10; 105 Bradfield. Discussion T 1:25–3:25 and as arranged; 160 Warren. D. J. Allee.

A review of the application of economic and political science concepts to problems in the use of natural resources including but not restricted to, water, land, forests, and fisheries, with emphasis on the public management of the environment. Attention will be given to concepts of regional growth, the impact of urban growth, and public decision making in the resource area.

Economics of Agricultural Development (Agricultural Economics 464). Spring term. Credit four hours. S/U grades optional. Prerequisite: 150 or Economics 101-102, or consent of the instructor. T Th 9:05 and W 7:30–9:25 p.m. 345 Warren. J. W. Mellor.

An examination of the processes of economic development in the developing nations and

their interactions with United States policy. Rural development policy will receive primary attention because (1) the bulk of developing nations have a dominant agricultural sector; (2) agriculture has a key role to play in the overall economic transformation of these economies; and (3) interactions of United States agricultural policy is a major component of total United States policy with respect to developing nations.

Marketing Research (Agriculture Economics 540). Spring term. Credit two hours. Permission of instructor required. Th 2:30–4:25. M. E. Brunk.
Objectives of marketing research, organization, and management of research agencies; problem identification; selecting and planning projects. Special attention is given to the designing and use of research in the management of the marketing function.

Social Responsibility in Marketing (Agriculture Economics 642). Spring term. Credit three hours. Open only to graduate students. T Th 12–2. 261 Warren. D. I. Padberg.
A seminar course concerned with public policy in marketing. Concepts from industrial organization, consumer economics, and anti-trust are integrated in appraising public decisions in the marketing area. Examples are drawn primarily from analyses of the food marketing system.

Seminar: International Agricultural Development (International Agriculture 600). Fall and spring terms. No credit. Third and fourth Wednesdays of month, 4:30. 135 Emerson. K. L. Turk and staff.
Primarily for graduate students interested in an integrated view of problems related to international agricultural development. Undergraduates with a specialization in international agriculture are encouraged to attend without registering. The seminar will focus on developing an understanding of the nature and interrelatedness to agricultural development of the social sciences, plant and animal sciences, foods and nutrition, and natural resources.

Public Health

Introduction to Hospital and Medical Care Organization (Business and Public Administration 140). Fall term. Credit three hours. R. M. Battistella.
Health services are described and analyzed against the backdrop of recent political, social, and economic developments in the United States and Western Europe. For purposes of organization and understanding of forces for change, health services are viewed as a social system—the medical care system—organized along structural-functional lines. Alternative methods of organizing and financing health care services are examined in an effort to evaluate the capacity of the medical care system to respond to pressures generated by changing disease patterns and rising expectations for medical care. The roles and responsibilities of various institutions and professional groups are examined with particular emphasis on the hospital as the central institution in the provision of community medical care. The process of community planning for health and welfare services is studied and the relationship of the hospital to that process is analyzed.

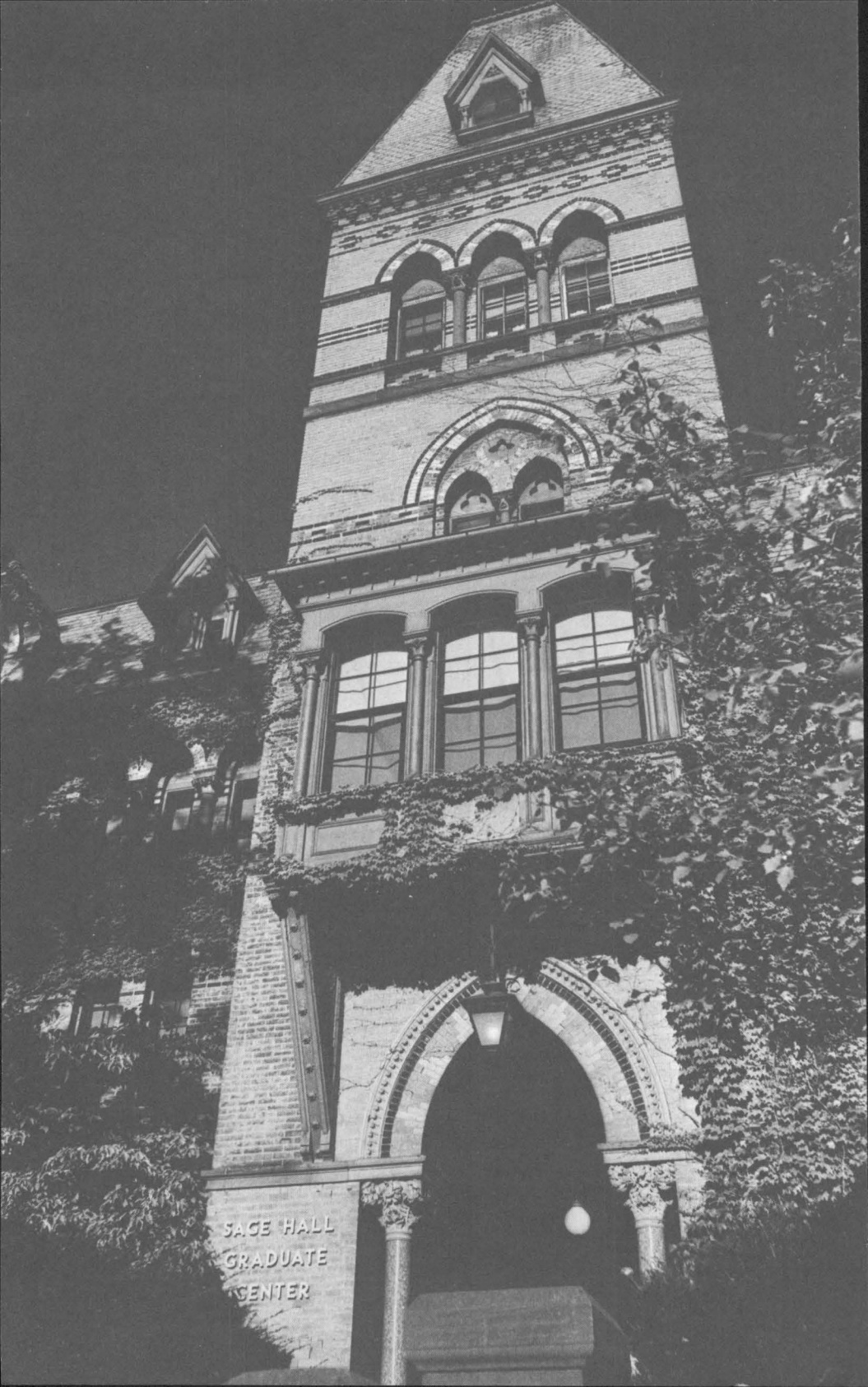
Introduction to Clinical Medicine: The Physician, The Hospital, and the Medical Care Delivery System. (Business and Public Administration 141). Spring term. Credit three hours. D. C. Samson.
The origins, selection, and training of physicians is discussed. Particular attention is given to the evaluation of hospital experience as it applies to the medical students and resident physicians. Human biology is surveyed with discussion centering on structure, function, and diseases of the major body systems. The training of medical specialists and allied health workers for the ambulatory and hospital setting is reviewed. Medical data collection, evaluation of medical care and medical staff organization in the hospital are discussed. Medical care systems in several countries are discussed and compared.

The Social Psychology of Hospitals (Business and Public Administration 142). Spring term. Credit three hours. D. B. Smith.
The aim of the course is to provide future administrators, planners, and researchers, with skill in analyzing the human problems in hospitals, a knowledge of the social-psychological dynamics involved and the sensitivity to deal with them intelligently. Specific topics include analysis of professionalism, role conflicts within the hospital, the sick role, illness behavior, and the management of institutional change. Some field work experience designed to enrich and reinforce the course content will be included.

Seminar in Health Research (Business and Public Administration 455). Fall term. Credit three hours. D. B. Smith.
The primary objective is to increase the student's ability to evaluate research reports and other studies, to assess their relevance for the field, and to formulate his own problems in a manner conducive to scientific investigation. An examination is made of the contributions of the social sciences and other disciplines to an understanding of current problems in the health field and in hospital administration in particular.

Statistics

See p. 23.


SAGE HALL
GRADUATE
CENTER

Register

University Administration

Dale R. Corson, President of the University
Robert A. Plane, University Provost
W. Donald Cooke, Vice President for Research
Lewis H. Durland, University Treasurer
William D. Gurowitz, Vice President for Campus Affairs
Samuel A. Lawrence, Vice President for Administration
E. Hugh Luckey, Vice President for Medical Affairs
Thomas W. Mackesey, Vice President for Planning
Paul L. McKeegan, Vice Provost
Arthur H. Peterson, University Controller
Richard M. Ramin, Vice President for Public Affairs
Robert F. Risley, Vice Provost
Neal R. Stamp, Secretary of the Corporation and University Counsel

Administration of the Graduate School of Nutrition

Dale R. Corson, President of the University
Robert A. Plane, University Provost
Richard H. Barnes, Dean of the School
Charlotte M. Young, Secretary of the School

Faculty

More than forty professors are on the faculty of the Graduate School of Nutrition. Most hold joint appointments in the School and have their main affiliation in other colleges at the University. The core faculty includes those professors whose primary appointments are in the Graduate School of Nutrition.

Core Faculty

Graduate Fields with which these professors are affiliated are indicated.

Barnes, Richard H., Ph.D., Professor, Nutrition
Call, David L., Ph.D., H. E. Babcock Professor of Food Economics, Agricultural Economics
Gaylor, James L., Ph.D., Professor, Biochemistry, and Nutrition
Latham, Michael C., M.D., Professor, Nutrition
Levitsky, David A., Ph.D., Assistant Professor, Psychology
McCormick, Donald B., Ph.D., Professor, Biochemistry, and Nutrition
Roe, Daphne A., M.D., Associate Professor, Human Nutrition and Food, and Nutrition
Simko, Vladimir, M.D., Clinical Assistant Professor
Wright, Lemuel D., Ph.D., Professor, Biochemistry, and Nutrition
Young, Charlotte M., Ph.D., Professor, Human Nutrition and Food, and Nutrition
Zilversmit, Donald B., Ph.D., Professor, Physiology, and Biochemistry

Joint Faculty

The titles and the departments (or sections) of primary affiliation of faculty members are indicated.

Apgar, B. Jean, Ph.D., Research Chemist, U.S. Plant, Soil, and Nutrition Laboratory
Austic, Richard E., Ph.D., Assistant Professor, Poultry Science
Bensadoun, André A., Ph.D., Associate Professor, Poultry Science
Bowering, J., Ph.D., Assistant Professor, Human Nutrition and Food
Comar, Cyril L., Ph.D., Professor, Physical Biology
Daniel, Louise J., Ph.D., Professor, Biochemistry
Devine, Marjorie M., Assistant Professor, Human Nutrition and Food

Hackler, L. Ross, Ph.D., Associate Professor, Food Science and Technology, Geneva
Hester, E. Elizabeth, Ph.D., Professor, Human Nutrition and Food
Hintz, Harold F., Ph.D., Assistant Professor, Animal Science
Hogue, Douglas E., Ph.D., Associate Professor, Animal Science
Krook, Lennart, D.V.M., Professor, Veterinary Pathology
Lengemann, Frederick W., Ph.D., Professor, Physical Biology
Loosli, John K., Ph.D., Professor, Animal Science
Morrison, Mary A., Ph.D., Professor, Human Nutrition and Food
Nelson, Walter L., Ph.D., Professor, Biochemistry
Nesheim, Malden C., Ph.D., Professor, Poultry Science
Newman, Katherine J., Ph.D., Associate Professor, Human Nutrition and Food
Pond, Wilson G., Ph.D., Associate Professor, Animal Science
Reid, John Thomas, Ph.D., Professor, Animal Science
Rivers, Jerry Margaret, Ph.D., Associate Professor, Human Nutrition and Food
Sanjur, Diva, Ph.D., Assistant Professor, Human Nutrition and Food
Schwartz, Ruth, Ph.D., Associate Professor, Human Nutrition and Food
Scott, Milton L., Ph.D., Professor, Poultry Science
Smith, Sedgwick E., Ph.D., Professor, Animal Science
Turk, Kenneth L., Ph.D., Professor, Animal Science
Van Campen, Darrell R., Ph.D., Research Biochemist, U.S. Plant, Soil, and Nutrition Laboratory
Van Soest, Peter J., Ph.D., Associate Professor, Animal Science
Visek, Willard J., Ph.D., M.D., Professor, Animal Science
Warner, Richard G., Ph.D., Professor, Animal Science
Wasserman, Robert H., Ph.D., Professor, Physical Biology
Williams, Harold H., Ph.D., Professor, Biochemistry
Young, Robert J., Ph.D., Professor, Poultry Science

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List of Announcements

Following is a list of *Announcements* published by Cornell University to provide information on programs, faculty, facilities, curricula, and courses of the various academic units.

New York State College of Agriculture and Life Sciences
College of Architecture, Art, and Planning
College of Arts and Sciences
Department of Asian Studies
Graduate School of Business and Public Administration
Field of Education (Graduate)
College of Engineering
Engineering at Cornell
Graduate Study in Engineering and Applied Sciences
General Information*
Graduate School
Graduate School: Course Descriptions
School of Hotel Administration
New York State College of Human Ecology
New York State School of Industrial and Labor Relations
Law School
Medical College (New York City)
Graduate School of Medical Sciences (New York City)
Cornell University—New York Hospital School of Nursing (New York City)
Graduate School of Nutrition
Officer Education (ROTC)
Summer Session
Veterinary College

* The *Announcement of General Information* is designed to give prospective students pertinent information about all aspects and academic units of the University.

Requests for the publications listed above should be addressed to

CORNELL UNIVERSITY
ANNOUNCEMENTS
Edmund Ezra Day Hall
Ithaca, New York 14850.

(The writer should include his zip code.)